REMARKS

This application has been carefully reviewed in light of the Office Action dated October 4, 2006. As indicated above, claims 2, 3, 13, 14, and 25 have been cancelled herein, without prejudice or disclaimer of subject matter. Claims 1, 4, 5, 7 to 12, 15 to 24, and 26 to 32 remain in the application, of which claims 1, 4, 5, 6, 7, 9, 15, 17 to 19, 23, 24, and 26 to 32 have been amended. Support for the newly-clarified features recited by the independent claims is found in the disclosure, including at least pages 4 to 6, 9 to 11, 14 and 16 of the specification, and FIGS. 1 and 2. Claims 1, 24, 31 and 32 are the independent claims. Reconsideration and further examination are respectfully requested.

Specification

The specification was objected to for various alleged informalities. Having amended the specified paragraphs without adding new matter, the Applicants respectfully request reconsideration and withdrawal of the objection.

Section 112 Rejections

Claims 17 and 18 were rejected under 35 U.S.C. § 112, ¶ 2, for allegedly being indefinite. Since claims 1 and 17 have been amended to provide proper antecedent basis all claim terms, reconsideration and withdrawal of the § 112, ¶ 2 rejection are therefore respectfully requested.

Section 101 Rejections

Claims 31 and 32 were rejected under 35 U.S.C. § 101, for allegedly being directed to non-statutory subject matter. In response, the Applicants have amended both of these claims in accordance with the Examiner's suggestion. Accordingly, reconsideration and withdrawal of the § 101 rejection are respectfully requested.

Section 103 Rejections

Claims 1 to 3, 5 to 7, 13 to 16, 20, 25, 31 and 32 were rejected under 35 U.S.C. § 103(a) over U.S. Patent No. 6,504,951 ("Luo") in view of U.S. Patent No. 5,912,994 ("Norton"); claim 4 was rejected under 35 U.S.C. § 103(a) over Luo in view of Norton and further in view of U.S.

Patent Application Publication No. 2003/0007683 ("Wang"); claims 8 to 12 were rejected under 35 U.S.C. § 103(a) over Luo in view of Norton and further in view of E. Littman and H. Ritter, "Adaptive Color Segmentation – A Comparison of Neural and Statistical Methods," IEEE TRANSACTIONS ON NEURAL NETWORKS, Vol. 8, No. 1, pp. 175-85 (Jan. 1997) ("Littman"); claims 17 to 19, 24, 26 to 30 were rejected under 35 U.S.C. § 103(a) over Luo in view of Norton and further in view of V. Boskovitz and H. Guterman, "An Adaptive Neuro-Fuzzy System for Automatic Image Segmentation and Edge Detection," IEEE TRANSACTIONS ON FUZZY SYSTEMS, Vol. 10, No. 2, pp. 247-61 (Apr. 2002) ("Boskovitz"); claims 21 and 22 were rejected under 35 U.S.C. § 103(a) over Luo in view of Norton and further in view of U.S. Patent Application Publication No. 2004/0170337 ("Simon"); and claim 23 was rejected under 35 U.S.C. § 103(a) over Luo in view of Norton and further in view of U.S. Patent Application Publication No. 2003/0063797 ("Mao").

The present disclosure is generally directed to defining a boundary separating a first region and a second region of a digital image, the digital image including one or more color arrangements characteristic of a first visual texture of the first region and one or more color arrangements characteristic of a second visual texture of the second region. A user input is received providing a training set of pixels exhibiting sample color arrangements associated with the first and second visual textures, and a neural network or a learning machine is trained to classify learning machine input sets based upon the training set, each learning machine input set including a pixel of interest and neighboring pixels. It is determined which pixels of the digital image satisfy criteria for classification as associated with the first region and the second region, by inputting learning machine input sets and outputting an indication of a region to which each of the pixels of interest belong.

Independent claims 31 and 32 recite program product claims having similar features to claims 1 and 24, respectively.

The applied art is not seen to disclose, teach, or to suggest the foregoing features recited by the independent claims. In particular, Luo, Norton and Boskovitz, neither alone nor in combination (assuming *arguendo* that such a combination were possible) are not seen to disclose at least the following features of the Applicants' claims: *i)* a user input is received providing a training set of pixels exhibiting sample color arrangements associated with the first and second

visual textures, *ii)* a neural network or a learning machine is trained to classify learning machine input sets based upon the training set, each learning machine input set including a pixel of interest and neighboring pixels and being derived from pixels in the digital image and *iii)* it is determined which pixels of the digital image satisfy criteria for classification as associated with the first region or the second region, by inputting learning machine input sets and outputting an indication of a region to which each of the pixels of interest belong.

Luo discloses the detection of sky regions in an image, by comparing potential sky pixels with a predetermined desaturation gradient for sky. *See* Luo, col. 3, ll. 5 to 15; and Abstract. In particular, an input image is received, and pixels are classified into sky-colored and non sky-colored pixels, where a color classifier is only seen to be pre-trained to detect a clear, light-blue sky seen at daytime, where color-based detection merely to detect candidate blue sky pixels, which are consistent with clear sky. *See* Luo, col. 8, ll. 19 to 29. Since the initial training set for the color classifier is merely understood to include images having ideal blue sky characteristics, Luo is not seen to disclose at least the feature that the training set of pixels is provided *using a user input* which exhibits sample color arrangements associated with first and second visual textures. *See* Luo, col. 8, ll. 29 to 35. In fact, Luo teaches away from classifying images on the basis of textures, indicating that, in order to be robust, sky detection needs to go beyond the mere detection of textures since coloration or texture of subject matter may not differentiate true sky regions. *See* Luo, col. 4, ll. 27 to 34.

Furthermore, while it is true that the color classifier is trained to classify pixels with a belief value indicating the likelihood that a pixel is blue sky, it is also true that *each pixel is classified independently* based upon the characteristics of *that pixel*, as represented by the belief map. *See* Luo, col. 8, ll. 55 to 64. Accordingly, Luo is not seen to disclose that a neural network or a learning machine is trained to classify learning machine input sets based upon the training set, where each learning machine input set includes a pixel of interest *and neighboring pixels*, in which it is determined which pixels of the digital image satisfy criteria for classification as associated with the first region and the second region by inputting learning machine input sets (including the pixel of interest *and neighboring pixels*) and outputting an indication of a region to which each of the pixels of interest belong.

Norton is not seen to remedy the deficiencies of Luo. Specifically, Norton describes edge detection or region definition technology, in which masks are understood to be constructed based upon luminance values in a test area. *See* Norton, col. 2, ll. 15 to 25; and Abstract. However, the relied upon portions of Norton are not seen to disclose, nor does the Office Action even assert that Norton discloses, at least the features that: *i)* a user input is received providing a training set of pixels exhibiting sample color arrangements associated with the first and second visual textures, *ii)* a neural network or a learning machine is trained to classify learning machine input sets based upon the training set, each learning machine input set including a pixel of interest and neighboring pixels and *iii)* it is determined which pixels of the digital image satisfy criteria for classification as associated with the first region and the second region, by inputting learning machine input sets and outputting an indication of a region to which each of the pixels of interest belong.

Boskovitz is further not seen to remedy the deficiencies of either Luo or Norton, as it is merely successful in describing the existence of second order (three-by-three) or fifth order (seven-by-seven) pixel neighborhoods. Having established that these types of relationships may exist between pixels, Boskovitz is still not seen to assert, nor does the Office Action even assert that Boskovitz asserts, at least the features that: *i)* a user input is received providing a training set of pixels exhibiting sample color arrangements associated with the first and second visual textures, *ii)* a neural network or a learning machine is trained to classify learning machine input sets based upon the training set, each learning machine input set including a pixel of interest and neighboring pixels and *iii)* it is determined which pixels of the digital image satisfy criteria for classification as associated with the first region and the second region, by inputting learning machine input sets and outputting an indication of a region to which each of the pixels of interest belong.

Accordingly, based on the foregoing amendments and remarks, independent claims 1, 24, 31 and 32 are each believed to be allowable over the applied references. The other rejected claims in the application are each dependent on these independent claims and are believed to be allowable for at least the same reasons. Because each dependent claim is deemed to define an additional aspect of the disclosure, individual consideration of each on its own merits is respectfully requested.

Conclusion

By responding in the foregoing remarks only to particular positions taken by the examiner, the Applicant does not acquiesce with other positions that have not been explicitly addressed. In addition, the Applicants' arguments for the patentability of a claim should not be understood as implying that no other reasons for the patentability of that claim exist.

No fees are believed to be due at this time. Please apply any other charges or credits to deposit account 06-1050.

Respectfully submitted,

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